Upper Little Deschutes Restoration Project

Draft Botanical Biological Evaluation

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for:

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Summary

There are no known occurrences of TESP botanical species within the ULDR planning area as determined from pre-field reviews and botanical field surveys. Because there are no TESP species, the Proposed Action will have no impact to TESP plants and will not contribute to a trend towards federal listing or a loss of viability to the population or species.

Table 1. Summary of Effects to TESP Botanical Species

Species	No Action	Proposed Action	Species	No Action	Proposed Action
Vascular plants					
Agoseris elata	N/A	N/A	*Piluaria americana*	N/A	N/A
Arnica viscosa	N/A	N/A	*Pinus albicaulis*	N/A	N/A
Astragalus peckii	N/A	N/A	*Potamogeton diversifolius*	N/A	N/A
Botrychium ascendens	N/A	N/A	*Pyrola dentata*	N/A	N/A
Botrychium crenulatum	N/A	N/A	*Rorippa columbiae*	N/A	N/A
Botrychium minganense	N/A	N/A	*Scheuzeria palustris ssp. americana*	N/A	N/A
Botrychium montanum	N/A	N/A	*Schoenoplectus subterminalis*	N/A	N/A
Botrychium paradoxum	N/A	N/A	*Utricularia minor*	N/A	N/A
Botrychium pumicola	N/A	N/A	Bryophytes		
Calamagrostis breweri	N/A	N/A	*Anastrophyllum minutum*	N/A	N/A
Carex capitata	N/A	N/A	*Anthelia julacea*	N/A	N/A
Carex diandra	N/A	N/A	*Blepharostoma arachnoideum*	N/A	N/A
Carex lasiocarpa var. *americana*	N/A	N/A	*Brachydontinum olympicum*	N/A	N/A
Carex livida	N/A	N/A	*Cephaloziella spinigera*	N/A	N/A
Carex retrorsa	N/A	N/A	*Conostomum tetragonum*	N/A	N/A
Carex vernacula	N/A	N/A	*Encalypta brevipes*	N/A	N/A
Castilleja chlorotica	N/A	N/A	*Entosthodon fasicularis*	N/A	N/A
Cheilanthes feei	N/A	N/A	*Haplomitrium hookeri*	N/A	N/A
Collomia mazama	N/A	N/A	*Harpanthus flotovianus*	N/A	N/A
Cyperus acuminatus	N/A	N/A	*Jungermannii polaris*	N/A	N/A
Cyperus lupulinus ssp. lupulinus	N/A	N/A	*Lophozia gillmani*	N/A	N/A
Eucephalis gormanii	N/A	N/A	*Marsupella sparsifolia*	N/A	N/A
Gentiana newberryi var. newberryi	N/A	N/A	*Nardia japonica*	N/A	N/A
Lipocarpha aristulata	N/A	N/A	*Polystrichastrum sexangulare*	N/A	N/A
Lobelia dortmanna	N/A	N/A	*Preissia quadrata*	N/A	N/A
Lycopodiella inundata	N/A	N/A	*Pseudocalliergon trifarium*	N/A	N/A
Lycopodium complanatum	N/A	N/A	*Rivulariella gemmipara*	N/A	N/A
Muhlenbergi minutissima	N/A	N/A	*Schistidium cinclidodonteum*	N/A	N/A
Ophioglossum pusillum	N/A	N/A	*Schofieldia monitcola*	N/A	N/A
Penstemon peckii	N/A	N/A	*Tortula mucronifolia*	N/A	N/A

Species	No Action	Proposed Action	Species	No Action	Proposed Action
Piluaria americana	N/A	N/A	*Trematodon asanoi*	N/A	N/A
Lichens					
Texosporium sancti-jacobi	N/A	N/A		N/A	N/A
Tholurna dissimilis	N/A	N/A		N/A	N/A
Fungi					
Gastroboletus vividus	N/A	N/A		N/A	N/A
Helvella crassitunicata	N/A	N/A		N/A	N/A
Pseudorhizina californica	N/A	N/A		N/A	N/A
Ramaria amyloidea	NI	NI		N/A	N/A
Rhizopogon alexsmithii	N/A	N/A		N/A	N/A

N/A No Habitat or species present

Introduction

The following Biological Evaluation addresses potential effects on Threatened, Endangered, Sensitive, and Proposed (TESP) botanical species from proposed activities within the Upper Little Deschutes Restoration (ULDR) planning area. This document summarizes the existing information on TES occurrences, as well as the results of extensive botanical surveys throughout the planning area.

Sensitive plants are those species identified by a U.S. Forest Service Regional Forester for which population viability is a concern, as evidenced by either a significant current or predicted downward trend in population numbers or density, or in a habitat capability that would reduce a species' existing distribution (Forest Manual 2670.5). The sensitive species list for Region 6, Pacific Northwest, was last updated on July 7, 2015 and from this the Deschutes/Ochoco list of TES species was also revised. This list includes vascular plants and non-vascular species such as bryophytes (mosses and liverworts), fungi (e.g. mushrooms), and lichens (Appendix A).

Threatened and endangered plants are those species whose viability is of concern and have been identified as such by either state and/or federal agencies. Within Oregon, the state and federal designations for rare plants are listed by the following agencies: Oregon Department of Fish and Wildlife, Oregon Department of Agriculture, and U.S. Fish and Wildlife Service. Proposed species are those that are under consideration for listing as Threatened or Endangered under the Endangered Species Act.

The ULDR planning area encompasses mixed conifer forest along the upper Little Deschutes River. The focus of this project is to 1) Protect or enhance quality habitat for key wildlife species, 2) Allow for safe and effective wildfire response, 3) Maintain developed and dispersed recreational opportunities, and 4) Contribute to local and regional economies.

While TES botanical species are not directly related to the purpose and need of the ULDR project, Forest Service policy does require that species do not become threatened or endangered because of Forest Service actions, and that viable populations of all native plant species be maintained (FSM 2670.22).

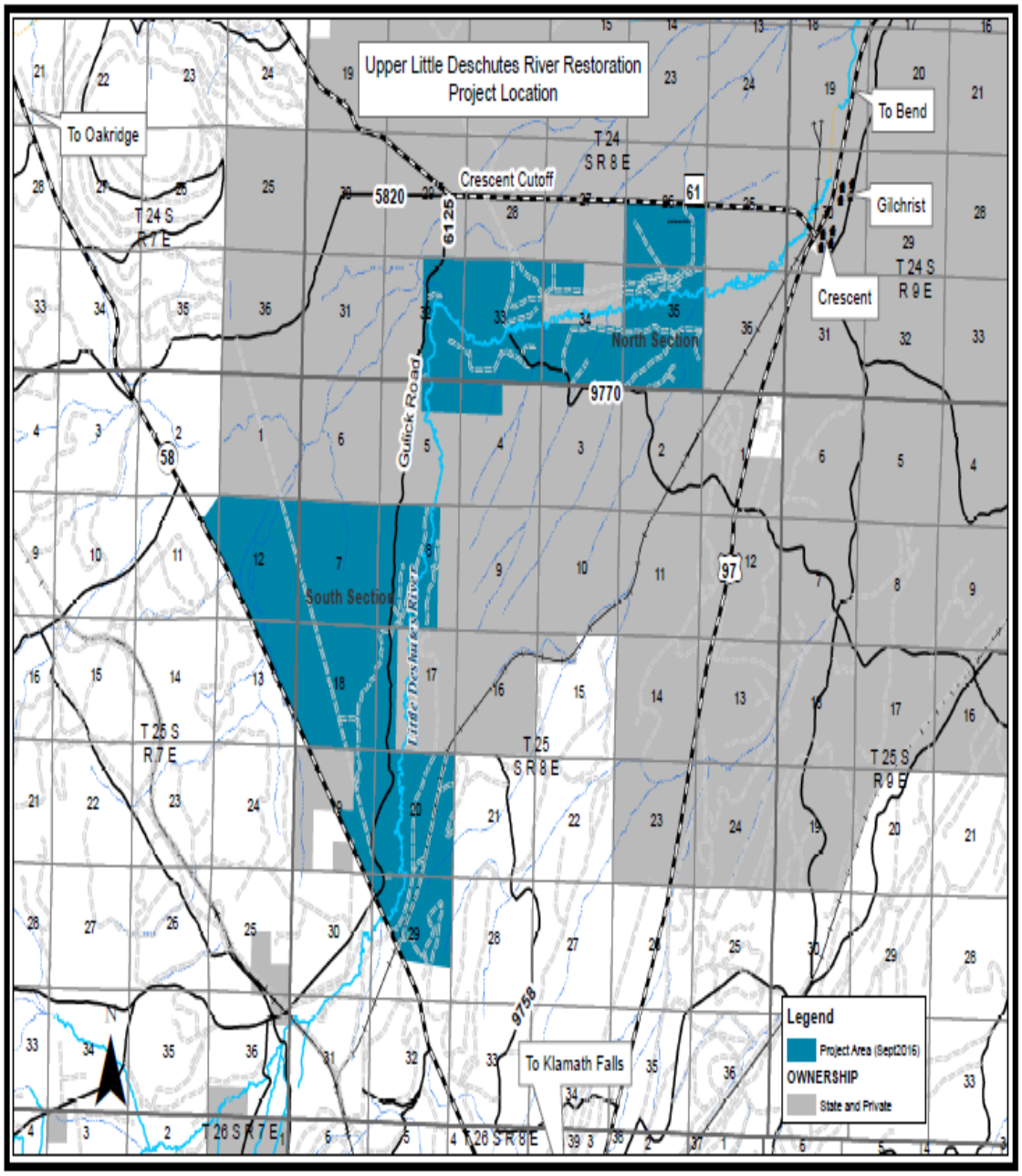
Planning Area

The Upper Little Deschutes Restoration project consists of two separate areas along the Little Deschutes River that are separated by private land (Figure 1). It includes the northern portion (also known as Odell

Pasture), and the southern area. The northern area is surrounded by private lands and Forest Service access is off County road 61 (also known as Crescent Cut-off road). The southern portion is adjacent to Highway 58 and partially bordered on the east side by private lands. Forest Service road 6125 (Gulick road) traverses through this portion and the western edge of the northern portion of the project area. Both areas are heavily utilized by the local population for fishing, hunting, recreation, and access to private lands adjacent to Forest Service lands.

Legal description of the planning area is as follows: Township 24S, Range 8E, Sections 26, 32, 33, 34, 35 and Township 25S, R08E Sections 4, 5, 8, 17, 19, and 20, Willamette Meridian

Fig. 1. Upper Little Deschutes Location Map



Purpose and Need

The purpose of this project is restoration related to: 1) maintaining or restoring the existing values and ecosystem services that a riparian environment provides through improving the hydrological function of the Little Deschutes River to benefit the unique habitats found adjacent to the river. 2) Maintaining or enhancing recreational experiences of hunting, fishing, and camping, with a sustainable road system that provides access while increasing wildlife security and reduces sedimentation to the river.

Proposed Action

The proposed action consists of the following:

1. Riparian Enhancement

The majority of the restoration work will be focused on repairing riparian damage, reconnecting oxbows, adding large wood structures (log jam) to reconnect the Little Deschutes with side channels (relic oxbow), and removal of encroaching lodgepole from a meadow area. Actions to implement this project will include, but are not limited to the following: a) redirecting the diversion to the pond and back into the river, b) filling in the remaining diversion ditch, and c) planting native riparian vegetation along restored areas.

2. Sustainable Recreation

To maintain popular camping and swimming areas along the river, these sites will either be rehabilitated or closed to prevent riparian damage along the river. Two large, denuded areas within the project area will be protected (with fencing) and restored through native plant seeding and planting.

3. Sustainable Roads

To maintain a sustainable road system within the project area, all unauthorized (i.e. user-created) trails and roads will be closed through various techniques that will include ripping, seeding and planting with native plants, and bouldering to prevent access. Other work will include the removal of two unauthorized bridges and four dump sites.

Note: A full description of the Proposed Action can be found in the Environmental Assessment, Upper Little Deschutes Restoration Project 2018

Resource Indicators and Measures

The most direct means to analyze and measure project effects on TES plants is to 1) determine if TES sites are present within the planning area, 2) determine if those sites will be affected by project activities, and 3) analyze the effects of those activities on known locations and habitat.

Methodology

Pre-field review - A pre-field review for botanical species was conducted in May 2017 to determine if there were any known sites of TESP species located within the ULDR planning area. The review consisted of checking the following database records for documented occurrences:

Information Sources

- Regional Forester's (R-6) Sensitive Plant Species List (revised July 2015)
- Deschutes National Forest Sensitive Plant List (revised July 2015)

- Oregon Biodiversity Information Center: Known rare plant occurrences within the Crescent Ranger District (data request May and December 2017)
- NRM (Natural Resource Manager) TESP database - Element Occurrence and Survey records for TESP plants on the Deschutes National Forest (accessed on May and December 2017)
- Botany Survey Records, Crescent Ranger District

Habitat analysis – A habitat analysis was conducted comparing habitat requirements of the Deschutes TES species with the known plant communities within the planning area (Appendix A). From that analysis, a list was compiled of potential TES botanical species. This list was then used to guide field work during botanical surveys.

Botanical surveys – During the pre-field review it was found that no botanical surveys had ever been conducted within the ULDR planning area. Without any surveys, there was no data to indicate if TES species were present, and where such sites may be located. Without such critical information, it would be impossible to ascertain what effect projects activities would have on TES botanicals. Therefore a key component for the TES analysis was initiating botanical surveys throughout the planning area. Preliminary surveys were conducted in the summer of 2015 and completed during the 2017 field season. These surveys were conducted by the District Botanist and an experienced Biological Technician. A general survey method was used, where traverses were made through pre-determined project units. During these surveys every attempt was made to identify and document all vascular and dominant non-vascular species seen within the unit.

All survey data was entered into NRM TESP-IS, the Forest Service's national database for natural resource information.

Incomplete and Unavailable Information

Because TES botanical species are rare or uncommon, there is often scant scientific information on the ecology and distribution of little known species. This is especially true for the non-vascular species such as fungi and bryophytes, many of which are known from only a few occurrences. Every attempt has been made to include all pertinent information relating to the TES botanical species that were found within the planning area.

Affected Environment

Existing Condition

Results of the pre-field review indicated there were no known occurrences of any TESP botanical species within the ULDR planning area, and during field surveys no TESP species were found.

Management Direction

Desired Condition

Forest Service direction states that viable populations of all native and desired nonnative species are to be maintained throughout their geographic range on National Forest System lands (FSM 2670.22). This direction also states that management objectives will be developed and implemented for populations and/or habitat of Sensitive species.

Environmental Consequences

Direct, Indirect, and Cumulative Effects

As there are no TESP occurrences within the ULDR planning area, there will be no effects from either the No Action or Proposed Action alternatives

Regulatory Framework

The following Forest Service and Federal policies guide the management of conservation of TES species on Forest Service lands.

I. Forest Service Manual

Forest Service Manual 2670.21 and 2670.32 (Sensitive Species) provides direction to manage National Forest System habitats and activities for threatened and endangered species to achieve recovery objectives so that special protection measures provided under the Endangered Species Act are no longer necessary.

Forest Service Manual 2670.22 (Threatened and Endangered) provides direction to 1) develop implement management practices to ensure that species do not become threatened or endangered because of Forest Service actions; 2) Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System lands; and 3) Develop and implement management objectives for populations and/or habitat of sensitive species.

Forest Service Manual 2670.31 (Threatened and Endangered Species) provides direction to 1) Review, through the biological evaluation process, actions and programs authorized, funded, or carried out by the Forest Service to determine their potential for effect on threatened and endangered species and species proposed for listing; 2) Avoid all adverse impacts on threatened and endangered species and their habitats, Avoid adverse impacts on species proposed for listing during the conference period and while their federal status is being determined; and 3) Identify and prescribe measures to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species. Protect individual organisms or populations from harm or harassment as appropriate.

II. Land and Resource Management Plan

The Deschutes National Forest Land and Resource Management Plan (DLRMP) under Chapter 4-60, 61 (Forest Management) provides standards and guidelines to protect and manage habitat for TES plant species. Additional guidance is provided in Appendix 13 of the DLRMP under the Sensitive Plants Program.

III. Federal Law

Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended. Section 7 of the Endangered Species Act requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.

DETERMINATION

The Proposed Action and Alternative will have no impact to TESP plants and will not contribute to a trend towards federal listing or a loss of viability to the population or species.

References Cited

Oregon Biodiversity Information Center. Documented sites of rare plants within the Crescent Ranger District. Data records request May and December 2017.

U.S. Department of Agriculture, Forest Service. Natural Resource Manager Database. TESP Occurrence and Survey Records. Accessed May and December 2017.

U.S. Department of Agriculture, Forest Service. 1990. Deschutes Land and Resource Management Plan.

U.S. Department of Agriculture, Forest Service. 1990. Forest Service Manual: FSM 2600 –Wildlife, Fish and Sensitive Plant Habitat Management. WO Amendment 2600-90-1. Effective 6/1/90.

Appendix A. Deschutes Forest list of Sensitive botanical species (Revised July 2015)

Scientific Name	Common Name	Code	Habitat
Vascular Plants			
Agoseris elata	tall agoseris	AGEL	Forest openings and forest edges adjacent to wet/moist meadows, lakes, rivers, streams. Ponderosa pine/bitterbrush/Idaho fescue plant associations; also with lodgepole pine, mixed conifer forests, and Engelmann spruce.
Arnica viscosa	Mt. Shasta arnica	ARVI6	Sparsely vegetated openings at high elevations. Scree, talus gullies and slopes w/ seasonal water runoff. Lava flows. May be w/in moraine lake basins or crater lake basins.
Astragalus peckii	Peck's milk-vetch	ASPE4	Basins, benches, gentle slopes, pumice flats. Generally a non-forest species but can occur in lodgepole pine openings. Mostly in sagebrush/grassland habitats.
Botrychium ascendens	Upward-lobed moonwort	BOAS2	Partially shaded or open settings, primarily in sedge/forb communities associated with seeps, drainages and edges of wet meadows. Engelmann spruce and stands of grand fir, Douglas fir and lodgepole pine.
Botrychium crenulatum	Crenulate moonwort	BOCR	Partially shaded or open settings, primarily in sedge/forb communities associated with seeps, drainages and edges of wet meadows. Engelmann spruce and stands of grand fir, Douglas fir and lodgepole pine.
Botrychium montanum	Mountain moonwort	BOMO	Partially shaded or open settings, primarily in sedge/forb communities associated with seeps, drainages and edges of wet meadows. Engelmann spruce and stands of grand fir, Douglas fir and lodgepole pine.
Botrychium paradoxum	Twin-spiked moonwort	BOPA9	Partially shaded or open settings, primarily in sedge/forb communities associated with seeps, drainages and edges of wet meadows. Engelmann spruce and stands of grand fir, Douglas fir and lodgepole pine.
Botrychium pumicola	pumice moonwort	BOPU2	Alpine and subalpine ridges, slopes and meadows. Montane LP forest openings, open forest in basins containing frost pockets or pumice flats.

Scientific Name	Common Name	Code	Habitat
Calamagrostis breweri	Brewer's reedgrass	CABR	Alpine to subalpine habitats in meadows, open slopes, streambanks, and lake margins.
Carex capitata	capitate sedge	CACA13	Usually in open, wet places, but sometimes in drier sites at high elevations. Known from five sites on the Sisters, Bend, and Crescent districts of the Deschutes National Forest.
Carex diandra	lesser panicled sedge	CADI4	Lesser panicled sedge. Swamps, sphagnum bogs, lake margins, and wet, often calcareous meadows at moderate elevations.
Carex lasiocarpa var. *americana*	slender sedge	CALAA	Swamps and wet meadows at mid elevations. Found on the Deschutes National Forest along the Deschutes River, south of Bend.
Carex livida	livid sedge	CALI	Occurs in all forest types in peatlands including fens and bogs; wet meadows with still or channeled water.
Carex retrorsa	retrorse sedge	CARE4	Wet meadows, bogs, swamps, and edges of streams, lakes, and rivers. Foothills and lowlands. ORNHIC data elevations range from 10' – 3,000'.
Carex vernacula	native sedge	CAVE5	Moist or wet places at high elevations, especially at the edges of melting snowfields and in meltwater streams. ORNHIC data elevations range from 7760' – 9110'.
Castilleja chlorotica	green-tinged paintbrush	CACH15	Ponderosa pine, lodgepole pine, and mixed conifer forest openings.
Cheilanthes feei	Fee's lip-fern	CHFE	Located in crevices on cliffs. Known from NE Oregon.
Collomia mazama	Mt. Mazama collomia	COMA	Meadows (dry to wet, level to sloping); stream banks and bars; lakeshores and vernal pool margins; forest edges and openings; alpine slopes.
Cyperus acuminatus	short-pointed cyperus	CYAC2	On the Deschutes NF, located on damp mineral soil of a broad, low-gradient shore of reservoir, in a community just below the *Spiraea* community. Sites on Crane Prairie Reservoir, Davis Lake.
Cyperus lupulinus ssp. *lupulinus*	Great Plains flatsedge	CYLUL	Upper shorelines. Known from NE Oregon.
Eucephalus gormanii (formerly *Aster gormanii)*	Gorman's aster	EUGO5	Alpine or subalpine mixed conifer, open to partially closed canopy. Rocky ridges, outcrops, or rocky slopes.
Gentiana newberryi var. newberryi	alpine gentian	GENEN	Alpine-subalpine mixed conifer openings. *Deschampsia cespitosa* meadows. Montane wet to dry meadows, sometimes adjacent to springs, streams, or lakes.

Scientific Name	Common Name	Code	Habitat
Lipocarpha aristulata	aristulate lipocarpha	LIAR6	Documented in Washington with *Rorippa columbiae* and *Rotala ramosior*. Wallowa and Malheur Cos.
Lobelia dortmanna	Dortmann's cardinalflower	LODO	In water of lake, pond, slow river or stream, or wet meadow. Only one known location in Oregon on Deschutes National Forest.
Lycopodiella inundata	inundated clubmoss	LYIN2	Deflation areas in coastal back-dunes; montane bogs, including Sphagnum bogs; less often, wet meadows.
Lycopodium complanatum	ground cedar	LYCO3	Edges of wet meadows; dry, forested midslope with 25% canopy cover.
Muhlenbergia minutissima	annual dropseed	MUMI2	Weathered lava soils in riparian; only ORNHIC site in Oregon is Jordan Crater, Malheur Co.
Ophioglossum pusillum	northern adderstongue	OPPU3	Dune deflation plains; marsh edges; vernal ponds and stream terraces in moist meadows.
Penstemon peckii	Peck's penstemon	PEPE10	Ponderosa pine forest openings, pine/mixed conifer openings; recovering fluvial surfaces (streambanks, overflow channels, inactive floodplains); seeps, rills, springs, vernal pools; draws, ditches, skid roads; dry or intermittent stream channels; moist-wet meadows.
Pilularia americana	American pillwort	PIAM	Alkali and other shallow vernal pools; not recently used stock ponds; reservoir shores.
Pinus albicaulis	Whitebark pine	PIAL	Often on rocky, exposed sites with shallow, well-drained soils. In upper portions of mountain hemlock vegetation series or above, in subalpine parkland. Associated tree species may include lodgepole pine, western white pine, subalpine fir and Pacific silver fir.
Potamogeton diversifolius	Rafinesque's pondweed	PODI	Lakes, ponds, including created habitat. Klamath, Harney and Lake Cos.
Pyrola dentata	Toothleaf pyrola	PYDE	Found in mixed conifer forests, forested serpentine and volcanic areas, hillsides of decomposed granite or loose, coarse sand or gravel near rocky outcrops.
Rorippa columbiae	Columbia yellowcress	ROCO3	Wet to vernally moist sites; meadows, fields, playas, lakeshores, intermittent stream beds, banks of perennial streams, along irrigation ditches, river bars and deltas.
Scheuchzeria palustris ssp. *americana*	rannoch-rush	SCPAA3	Open canopied bogs, fens, and other wetlands where often in shallow water.

Scientific Name	Common Name	Code	Habitat
*Schoenoplectus subterminalis (*formerly *Scirpus subterminalis)*	swaying bulrush	SCSU10	Generally submerged to emergent in quiet water 2-8 decimeters deep, in peatlands, sedge fens, creeks, ditches, ponds and lakes.
Utricularia minor	lesser bladderwort	UTMI	Occurs underwater in lowland and montane fens, sedge meadows, low-nutrient lakes and peatbog pools. Deschutes, Clackamas, Lane, Klamath, Jackson, Coos, Douglas, Harney, Marion and Linn Cos. There are documented populations on the Bend and Sisters districts of the Deschutes National Forest.
Bryophytes			
Anastrophyllum minutum	liverwort	ANMI8	Typically associated with other bryophytes in tight mats on ledges or at the base of cliffs in the mountain hemlock zone.
Anthelia julacea	liverwort	ANJU	Found on peaty soil in subalpine/alpine habitats above 5,000 ft. Grows on wet crags, streamsides and areas where snow lies late in the year. In Oregon often associated with low ericaceous shrubs.
Blepharostoma arachnoideum	liverwort	BLAR	On rotten logs in old growth forests in mesic habitats from British Columbia to California.
Brachydontium olympicum	moss	BROL2	Forming loose mats on exposed acidic boulders or soil in rock crevices. In boulder fields, moraines, and ledges of cliffs, often in areas of late snowmelt. Subalpine to alpine elevations between 5,000 and 6,000 feet. On Oregon's Mt. Hood *Brachydontium* occurs above timberline at about 6,000 ft where the plant association is probably *Phyllodoce empetriformis* and *Cassiope mertensiana* heath. Elsewhere in the Pacific Northwest, *Brachydontium* probably also occurs in *Pinus albicaulis, Tsuga mertensiana, Abies lasiocarpa,* and *Abies amabilis* associations.
Cephaloziella spinigera	liverwort	CESP6	Bogs and fens; boreal and montane. Known from Fremont/Winema National Forest. In OR, associated with moss genera *Warnstorfia, Drepanocladus, Tomentypnum* and *Meesia* in moss-dominated communities.
Conostomum tetragonum	moss	COTE70	Occurring as small sods or inconspicuous individual shoots intermixed with other bryophytes, on soil in rock crevices in boulder fields, moraines, and ledges of cliffs. Subalpine to alpine elevations, often in areas of late snowmelt. On Oregon's Mt. Hood, *Conostomum* occurs above timberline at about 6,500 ft, where the plant association is probably *Phyllodoce empetriformis* and *Cassiope mertensiana* heath. Elsewhere in the Pacific Northwest, *Conostomum* probably also occurs in *Pinus albicaulis, Tsuga mertensiana, Abies lasiocarpa*, and *Abies amabilis* associations.

Scientific Name	Common Name	Code	Habitat
Encalypta brevipes	moss	ENBR2	Occurs in soil on ledges and in crevices on cliffs on both igneous and siliceous substrates; sites may be subject to frequent fog penetration; apparently restricted to unglaciated regions; +/- circumboreal, British Columbia to Oregon. Known from Rogue River/Siskiyou National Forest. Associated with Pacific silver fir, subalpine fir, and mountain hemlock communities.
Entosthodon fascicularis	moss	ENFA2	Grassland, oak savanna, grassy balds and rock outcrops. Individual plants or small patches on seasonally wet, exposed soil in seeps or along intermittent streams. Occurs on Eugene BLM but not documented on Oregon National Forests. Including but not necessarily limited to mountain hemlock, Douglas fir and white oak communities.
Haplomitrium hookeri	liverwort	HAHO4	On soil in open areas, intermixed with other liverworts and hornworts.
Harpanthus flotovianus	liverwort	HAFL9	Associated with bogs and fens. Associated bryophyte genera include *Warnstorfia, Drepanocladus, Tomentypnum* and *Meesia.* On Deschutes, collected by Rick Dewey at about 5600' in a smallish, low gradient, persistently groundwater-fed community in the Three Sisters Wilderness Area. Associated with 8 fen reference species: *Dodecatheon jeffreyi*, *Triantha* (*Tofieldia*) *glutinosa*, *Eleocharis quinqueflora*, *Pedicularis groenlandica*, *Hypericum anagalloides*, *Vaccinium uliginosum*, *Kalmia microphylla* and *Platanthera* (*Habenaria*) sp
Jungermannii polaris	liverwort	JUPO3	Subalpine to alpine habitats above 5,000 ft. Forms small to sometimes extensive mats over peaty soil on damp ledges and crevices of rocks, sometimes along streams and rivulets, sometimes aquatic. Associated with *Tsuga mertensiana* and *Abies lasiocarpa* forests.
Lophozia gillmanii	liverwort	LOGI3	Cliffs and ledges; boreal and montane. One Oregon site in wet meadow at 6500'.
Marsupella sparsifolia	liverwort	MASP10	In pure patches or intermixed with other bryophytes on sandy stream terraces or on acidic soil in late snow areas.
Nardia japonica	liverwort	NAJA4	Open sites on rocky ledges or in rocky meadows. Mountain hemlock zone.

Scientific Name	Common Name	Code	Habitat
Polytrichastrum sexangulare var. *vulcanicum* (was *Polytrichium sphaerothecium*)	moss	POSEV2	Forming green to brown sods on igneous rocks in exposed or sheltered sites, subalpine parkland to alpine krummholz. On Oregon's Mt. Hood, occurs at or above timberline at about 6,500 ft elevation, where the plant association is probably *Phyllodoce empetriformis* or *Cassiope mertensiana* heath. Elsewhere in the Pacific Northwest it probably also occurs in *Pinus albicaulis, Tsuga mertensiana, Abies lasiocarpa*, and possibly *Abies amabilis* associations. Associated bryophytes may include *Conostomum tetragonum* and *Gymnomitrion.*
Preissia quadrata	liverwort	PRQU2	On soil with little organic material, often on cliff ledges or in crevices in rocky areas.
Pseudocalliergon trifarium	moss	PSTR5	Forming lawns or inconspicuously intermixed with other bryophytes in medium to rich montane fens where it grows submerged to emergent in pools or on saturated ground, usually in full sunlight. Fen pools may dry up in late summer. Elevations range from 5000-6000 feet. Forest types include *Abies amabilis, Abies concolor, Abies x shastensis, and Pinus contorta ssp. latifolia* associations. Calliergon trifarium is one of several species of so-called "brown mosses" that occur in mineral-rich fens. Associated vascular plants in Oregon and Washington include *Eleocharis quinqueflora, Carex limosa, Scheuchzeria palustris, and Triglochin maritimum.* Associated bryophyte species include *Hamatocaulis vernicosus, Tomentypnum nitens, Meesia triquetra and Helodium blandowii*.
Rivulariella gemmipara	liverwort	RIGE2	Tiny, aquatic liverwort found in high elevation springs and creeks with flowing, cold water (Formerly *Chiloscyphus gemmipara*)
Schistidium cinclidodonteum	moss	SCCI5	In large loose mats on wet or dry rocks or on soil in rock crevices, often along intermittent streams. Shrub associates include *Phyllodoce empetriformis* and *Cassiope mertensiana*. Ponderosa pine, grand fir, Pacific silver fir, subalpine fir, mountain hemlock and possibly whitebark pine communities.
Schofieldia monticola	liverwort	SCMO11	Under heather or beside small streams. Long considered endemic to Pacific Northwest but recently reported from Russia. With *Cassiope, Phyllodoce* and liverworts such as *Moerckia.*
Tortula mucronifolia	moss	TOMU70	Riparian *Populus* and montaine *Abies.* Higher elev (5000-7000 ft).

Scientific Name	Common Name	Code	Habitat
Trematodon asanoi (= T. boasii)	moss	TRAS3	Forming loose mats on moist bare soil along the edges of trails, streams and ponds in the subalpine zone. Soils usually have some organic content and are irrigated by meltwater from late-season snowbeds. Little is known about associated species. Habitats probably include *Phyllodoce empetriformis* and *Cassiope mertensiana heath* and *Tsuga mertensiana, Abies lasiocarpa,* and *Abies amabilis* forest associations.
Lichens			
Texosporium sancti-jacobi	Woven spore lichen	TESA	Whitish soil crust lichen often found on old root clumps of *P. secunda* or scat. Documented on The Island and Canadian Bench, CRNG. Undocumented occurrences by R. Demmer on BLM along breaks of lower John Day R.
Tholurna dissimilis	Urn lichen	THDI5	Occurs on Sisters District, Black Butte - Open *Pinus albicaulis* stand on moderate slope, with dense understory of shrubs; also open *Abies lasiocarpa* forest with low stunted trees.
Fungi			
Gastroboletus vividus	fungus	GAVI7	Found in association with the roots of *Abies magnifica* and *Tsuga mertensiana* above 5,000'. Fruits July-September. A known site at Crater Lake National Park.
Helvella crassitunicata	fungus	HECR13	Occurs in montane forests containing *Abies* spp., from old growth and younger age groups, from low to high elevation in the fall and winter, occasionally on trails, or other moderately disturbed areas. Documented on Sisters district, Deschutes National Forest.
Pseudorhizina californica	Fungus	PSCA17	Found fruiting in June on or adjacent well-rotted stumps or logs of coniferous trees, or on soil in rich brown rotted wood (Syn. *Gyromitra californica*)
Ramaria amyloidea	fungus	RAAM4	Humus or soil. Fruits in September and October. Found in Douglas fir, grand/white fir, and hemlock forests.
Rhizopogon alexsmithii	Fungus	RHAL13	Fruiting bodies found below soil surface with various pine species, especially *Tsuga heterophylla* and *Tsuga mertensiana*. (Syn. *Alpova alexsmithii*)